

REMARKS

Claims 2, 4-7, 9-12, 15-17, 19-22, and 24-27 have been examined and finally rejected. The present response amends the specification, amends claims 2, 4, 6, 7, 19, 21, 22, and 24, and cancels claims 5, 15-17, 20, and 25. Accordingly, claims 2, 4, 6-7, 9-12, 19, 21-22, 24 and 26-27 remain pending. Entry of the present amendment, reconsideration, and allowance of all pending claims are respectfully requested.

The Drawings

In response to the Examiner's requirement for corrected drawings, formal drawings are being submitted herewith.

Claim Objections

Claim 16 has been objected to due to an informality in that it depends from cancelled claim 14. The cancellation of claim 16 moots this objection.

Objection to the Specification

The Examiner has objected to the amendment to the specification asserting that Applicants lack authority to add an appendix that is not a gene sequence listing or computer programmable code. To expedite prosecution, the previously added appendix has been deleted and instead various subject matter from that appendix and from other publications incorporated by reference therein have been copied into the body of the Specification.

Rejection Under 35 U.S.C. §112, first paragraph

Claims 5-6, 20-21, and 25-26 have been rejected under 35 U.S.C §112, first paragraph as being insufficiently enabled. Although claims 5, 20, and 25 have been cancelled in the present amendment, their limitations have been incorporated into their parent claims 4, 19, and 24

respectively. The grounds for rejection are respectfully traversed for the reasons that follow. It is respectfully submitted that the Specification, as amended, does in fact enable one of skill in the art to make or use the invention commensurate in scope with the rejected claims.

The rejection asserts that Fig. 2, being based on a particular set of parameters, is only enabling for a Raman amplification scenario corresponding to those parameters and that changes in these assumptions are not dealt with by the present application.

However, Fig. 2, although itself directed to a particular set of assumptions, follows naturally from a theoretical background laid out by the inventors in their provisional application. This provisional application was expressly incorporated by reference within the discussion of Fig. 2 and in response to this rejection, elements of the analysis found in the provisional application are being imported into the specification.

In Fig. 2, there is a solid line which is a contour representing combinations of forward gain and input power per channel that give rise to a particular desired OSNR. The Y axis of Fig. 2 also gives the four-wave mixing suppression level at the points along this contour. The contour itself can be regenerated for other desired signal to noise ratios by use of equations (4) through (7). These equations give the noise powers generated by the EDFA and the Raman amplifier and one of skill in the art will know how to combine them to obtain total noise power for the cascaded amplifiers. OSNR is of course readily determined as a ratio of the output signal power over this noise power. It will be noted that the Raman gain coefficient of the fiber is a variable in equations (4) and (5) and thus contributes to the total Raman amplifier noise power. The four-wave mixing level is given by equation (1), with the integral being approximated by equation (3), in the application as amended. The non-linear coefficient appears in the equation (1). Also in equation (1) there is a phase mismatch parameter which is itself defined by equation (2). Equation (2) takes into account chromatic dispersion.

With the significance of these various equations to the plot of Fig. 2 being understood, the questions raised by the Examiner are readily answered.

“How does one with ordinary skill in the art arrive at the solid contour?” One of ordinary skill in the art arrives at the solid contour by application of equations (4) through (7).

“What effect do the assumed variables have on the shape of the curve in Figure 2?” The assumed dispersion value affects the four-wave mixing product level rather than the shape of the contour representing combinations in forward gain and input power per channel that give rise to a desired OSNR. The effective area likewise impacts the four-wave mixing product level rather than the contour shape by way of its influence on the non-linear coefficient of Fig. 1.

“How may the plot in Fig. 2 be derived by the physics and mathematical equations in the provisional?” The plot in Fig. 2 may be derived from equations (1) through (7) as explained in the text added to the application by amendment. One of skill in the art will of course realize that equation (1) through (3) gives four-wave mixing product level and also that equations (4) through (7) allow one to readily relate gain to OSNR.

“Where does the suggestion in the provisional to make a plot resembling Fig. 2? After reviewing the provisional Application, the Examiner has found a lack of any suggestion or teaching of the limitations of the aforementioned claims. Where is this teaching? How does the provisional provide enablement for these claims?” The plot is a mathematical representation of the equations found in the provisional given certain assumptions. The Examiner concedes that the Specification, prior to amendment, enables the particular embodiment shown in Fig. 2. As has been explained, the equations found in the provisional application, and now imported into the body of the Specification, allow one of skill in the art to practice the present invention using different assumptions.

“Will the type of fiber, say from a True-Wave-RS to a DSF alter the plot? If so, what affect will it have on the plot?” A given fiber type will have associated parameters such as non-linear coefficient, chromatic dispersion, Raman gain, effective length, *etc.* These are variables in equations (1) through (7) and thus affect the plot.

The rejection under 35 U.S.C. §112, first paragraph is therefore overcome and its withdrawal is respectfully requested.

Rejections Under 35 U.S.C. §102 and 35 U.S.C. §103

Claims 2, 4, 11-12, 15-17, 19, 22, 24, and 27 have been variously rejected over the cited art. Solely for the purposes of expediting prosecution, independent claims 4, 19, and 24 have been amended to incorporate the limitations of claims 5, 20, and 25, the latter claims being cancelled without prejudice. No prior art rejections stand against claims 5, 20, and 25. The independent claims 4, 19, and 24 should therefore be in condition for allowance. Claims 11-12, 22, and 27 are submitted to be allowable for at least the reason of their dependence from their allowable parent claims. The cancellation of claims 15-17 moots their rejection. Claim 2 has been amended similarly to claims 4, 19 and 24, and is also respectfully submitted to recite subject matter neither disclosed nor suggested by the art of record. Claim 2 should therefore also be in condition for allowance.

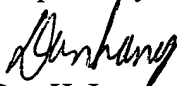
Rejections Under 35 U.S.C. §112, second paragraph

Claim 16 has been rejected under 35 U.S.C. §112, second paragraph as being indefinite. The cancellation of claim 16 moots this rejection.

Conclusion

For the foregoing reasons, Applicant believes all the pending claims are in condition for allowance and should be passed to issue. If the Examiner feels that a telephone conference would in any way expedite the prosecution of the application, please do not hesitate to call the undersigned at (408) 446-8694.

Respectfully submitted,


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